

The London Close Reasoner

LOGICAL STRUCTURE

As the rules of Logic apply to arguments only after they have been exhibited at full length in the bare elementary form, it may be useful to subjoin some remarks on the mode of analyzing, and reducing to that form, any train of argument that may be presented to us: since this must in general be the first step taken in an attempt to apply logical rules.

Whately, *Elements of Logic* (1826)

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1 Introduction

The main business of this module is to present techniques for carrying out the structural analysis of passages. We mean here **logical structure**; structure has to do with the ways in which the various components of the passage are related to each other; the **logical** structure is made up of those aspects of the structure that are relevant for the assessment of the passage from the point of view of rationality. This may or may not coincide with the **physical** structure, the sequence of words and sentences.

We will usually be interested in passages containing arguments, and the emphasis will be on the analysis of argument structure. But there are other structural aspects of passages that concern us as close reasoners — definitions, distinctions and explanations, for example — and we need methods to handle them.

Structural analysis is a vital skill for close reasoners. It is an absolutely necessary preliminary for any rational evaluation of a passage. This means first that it is essential for competent participation in public reasoning, which consists in the tossing about of passages. This is especially so when you are receiving a presentation; in dialogue or debate your partner may be nice enough (or cruel enough) to do it for you, though it is just as likely that we will need to give rather than receive help..

But the skill is also essential for private reasoning. Our heads, perhaps, are not always full of passages, but when we look inside and ask ourselves what we really think, and whether we should continue to think in that way, we find that our heads soon become full of arguments

and other structures that require analysis. Locating, clarifying and evaluating these structures is an important step in making our thoughts more rational.

1.1 Tool box approach

A structural analysis of a passage has two main phases; we must discover the structure, and we must find a way of representing it, for if we cannot in some way state or picture what the structure is we will not be able to think clearly about it.

But there is no single right way to do an analysis. There are instead a number of different techniques to use in the two phases, and sometimes one, sometimes another is the better to use. They are like so many tools in a tool kit, and the trick is to choose the right one for the case at hand.

1.2 Information hiding

Of course, throughout the process we use our three basic strategies of top-down, bottom-up and iteration. And a fourth, which we introduce here, called **information hiding**.

Our mental powers are limited, and we can't think about everything at once, so to think about one point adequately we need to put other points out of mind temporarily, hide the distracting information. But we mustn't hide it so well that we can't get it back when we need it.

One thing we can do is (we sink here to metaphor) put the information in a box, and label the box. With the information in the box we won't be confused by it, but with the label we can get it back when we need it. We can do this by using abbreviation, and by defining special terms, among other methods. Some of these techniques will be illustrated in this module.

This concept of information hiding comes from computer science, where it is used for ways of preventing undesired interactions between different parts of a program; each part should be allowed to have only the information it needs². But the idea can also be applied to the human mind.

1.3 Need for judgment

Structural analysis is never simply a

matter of mechanically applying our techniques, useful as they are. It is necessary actually to think, and judgment is always required. This happens in two ways.

1.3.1 Interpretation

First of all, judgment is needed on matters of interpretation. Authors of passages seldom spell everything out. (And how boring it would be if they did!) Gaps are left to be filled in by the consumer of the passage, and it takes judgment to do this in the right way. Less competent authors may leave too many gaps, or give inadequate or contradictory clues about filling them in, perhaps do to unclarity in the author's own thinking, so that genuine questions arise about how the passage is to be understood.

This is the interpretation problem. We will not say much about it here except to mention a useful guiding principle, which usually goes under the name of the **principle of charity**. It states that, given a choice between interpretations, choose the one that would make your author out to be more rational.

There are two reasons for this. First, in many circumstances this is more likely to be the correct interpretation; we are naturally predisposed to underestimate the mentality of our opponents in debate, and this principle provides a helpful corrective. Second, we stand to learn more from a passage under its better interpretation.

But this principle should not blind us to obvious facts. People sometimes think and say really dumb things. Sometimes authors are dishonest. Judgment is always required in interpretation.

1.3.2 Discrimination

The second place where judgment is required in logical analysis is the problem of discrimination. This is the problem of drawing the line between what it is important to bring out in the analysis and what had best be overlooked. Most passages will have more logical structure hidden in them than it is worth our while to dig out. What we want is to bring out those parts of the structure that will help in our evaluation, but we don't want to go beyond this to get bogged down in details.

One principle governing this might be put in the slogan "Go for the jugular". Another guideline is to carry the analysis one step beyond what is strictly necessary for evaluation, just to be on the safe side. And, as an academic exercise it is sometimes instructive to carry an analysis a lot farther than that. But basically, this depends on our purpose in carrying

2. Kernighan and Richie, *The C Programming Language*, 1978, a widely used book, have five entries for this topic in their index.

out the analysis, and is again a matter of judgement.

2 Passages

We will take a generous view of what constitutes a passages. Any communication will count.

In ancient Greece there was a philosopher named Cratylus who held that everything is always changing and that consequently it is impossible to say anything true about reality since by the time you finish speaking reality will have become something else. So he gave up speaking about reality, and would do no more than move his finger³. Well, for us, when Cratylus moves his finger, that is a passage. So is the entire *Encyclopaedia Britannica*.

But in practice, the passages we consider will be more tractable. For academic purposes they will be short bits of prose, usually a paragraph or two, though out of the classroom it is usually necessary to consider longer passages to get a clear picture of the argument. But the methods apply just as well to these longer pieces — even to whole speeches, essays and books. The methods can also be applied to non-prose communications such as cartoons, TV commercials, film, or even art in so far as it contains a 'message'.

3 Understanding

The process of analyzing a passage oscillates between two sub-processes. One is figuring out what the passage is saying, what it means. The other is representing in some way the understanding of the passage we have reached so far. These two operations work together; the best way to gain an understanding of a passage is usually to try to represent or express what you understand of it.

3.1 Basic understanding

The first thing to do, of course, is to make sure you understand the passage at the surface level. It is amazing how often beginners skip over this simple requirement, and get into trouble later in the analysis.

This involves obvious things. We must read the passage carefully, several times if need be. We must track the syntax of the sentences, and we must notice, and take action (dictionary) when we encounter unfamiliar words.

Perhaps we lack vital background knowledge. Sometimes a little research will help. Sometimes we can limp along without that knowledge; question marks at the beginning of the analysis simply remain as question marks at the end. Sometimes we will conclude that the passage doesn't have any clear meaning, the author being incompetent, confused or devious, though in this case we should have our own argument to defend this assessment.

And sometimes we will have to confess that the passage is simply over our heads, and we will have to abandon the analysis. But if this happens with a presentation intended for us, and not just for people with special knowledge, we will have a right to complain. And we shouldn't give up too soon.

At this level, the best test whether we understand a point is whether we can restate it in our own words. Close reasoners are frequently heard to mutter as they settle down to the analysis of a passage.

3.2 Stating the main thrust

This is a top-down method; it is useful in getting an overall grasp of what is going on in the passage to prepare the way for closer analysis. The idea is to identify the **main thrust** of the passage by trying to state in a single sentence what the author is mainly doing.

The sentence starts with something like "In this passage the author is mainly ...", and is completed in ways such as these:

telling a story about his childhood.

defending her actions on the night of the fire.

explaining why the stove exploded.

announcing her plan for the rest of the essay.

justifying representative democracy

urging us to oppose communism

The key point is actually to formulate this sentence — put it into words, real words — in your mind, aloud or in writing. Writing is best because then you can be sure that you really do have the words, and you can check back to see what they were. It is astonishing how we humans can imagine that we have got something in

3. Freeman, *Pre-Socratic Philosophers*, 1966, p. 284.

words in our heads when we really do not⁴!

The main thrust, if you manage to get it, will usually open up the passage for the rest of your analysis; you will see pretty quickly whether there is an argument to be evaluated. If the author is defending, justifying, proving or trying to prove, etc. then you can expect an argument. And you already have the conclusion. If the author is defending a proposition, then that is the conclusion. If she is defending an attitude, an action, a person, or the like, then we may take as conclusion the proposition that the thing defended is good, right, proper, worthy, or the like. Once you identify the author's conclusion you must go on to discover the reasons, but that is usually not so hard.

On the other hand, if the author is telling, announcing, reporting, recounting, or the like, then there is probably not an argument; you don't give reasons in activities such as these. But you can't be sure about passages like that. There may be an argument on the side; it is there, but not the main thrust, perhaps. Or your passage may be just a part of a larger argument.

If the author is mainly **explaining** something, then the situation becomes more delicate. If what is being explained is why you ought to believe something, or take up a certain attitude, then you do indeed have an argument. But if the author is explaining why something happened or why some situation is the way it is, then that is not an argument, though argument may be involved incidentally. We say more about this case below.

Remember that the main thrust technique, like all our techniques, is meant to be used iteratively; very often the first attempt to state the main thrust will turn out to be wrong in some way, and we will just have to correct it or do it over again.

Here are some examples:

(1) Irvin S. Cobb (1876-1944)

[Corn licker:] It smells like gangrene starting in a mildewed silo, it tastes like the wrath to come, and when you absorb a swig of it you have all the sensations of having swallowed a kerosene lamp. A sudden violent jolt of it has been known to stop the victim's watch, snap his suspenders and crack his glass eye right across⁵.

In this passage, the author is describing corn licker. It is a pure description; there is no argument.

(2) Hasegawa Nyozeikan (1875-1969)

The war was started as the result of a mistaken "calculation" which transcended mathematics. We believed with a blind fervor that we could triumph over scientific weapons and tactics by means of our mystic will.... The characteristic reliance on intuition by the Japanese had blocked the objective cognition of the modern world⁶.

In this passage, the author is explaining why Japan took part in World War II. It is a straight explanation, without argument, though, of course, not necessarily a correct explanation.

There are, to be sure, some arguments that might be said to be hovering in the vicinity of this passage, and these may interest us.

For example, since part of the explanation is that somewhere sometime some people reasoned something like this: "We have 'mystic will'; therefore, we will triumph," that argument might be said to lie in the background.

Again, the passage may suggest an argument something like "The Japanese went into the war on the basis of intuition and, as we know, that was a disaster for them. Therefore, we shouldn't trust intuition."

But neither of these are actually in the passage, and the author is not arguing them.

4. "Every Learner, in every subject, should accustom himself to endeavour to state the point of the difficulty in writing, whether he want to show the result to another or not. I wish I had kept a record of the number of times [on] which I have insisted on this being done, previously to undertaking the explanation, and of the proportion of them in which the writer has acknowledged that he saw his way as soon as he attempted to ask the road in precise written language. That proportion is much more than one half. Truly said Bacon, that writing makes an exact man." (Augustus De Morgan, *Formal Logic*, 1847, p. 309)

5. Bartlett, *Familiar Quotations*, 1980, p. 757:6.

6. *The Lost Japan*, 1952. Taken by Bartlett from *Sources of Japanese Tradition*, edited by William Theodore de Bary, 1960. (Bartlett, *Familiar Quotations*, 1980, p. 756:3)

(3) John Quincy Adams (1767-1848)

Individual liberty is individual power, and as the power of a community is a mass compounded of individual powers, the nation which enjoys the most freedom must necessarily be in proportion to its numbers the most powerful nation⁷.

In this passage the author is arguing that the power of a nation goes up with its freedom for individuals. This is clearly an argument. Its conclusion is that the nation with the greatest freedom has the greatest power in proportion to its size. It is not a good argument, of course; we will look at it more closely below.

3.3 Check indicator words

This is a bottom-up technique. It can help you on your way to a statement of the main thrust, and it can help you sort out the structure of an argument once you have spotted one.

There are certain words and phrases in the language that are often used to indicate conclusions, and others to indicate premises. With any luck, your author will have sprinkled the passage with a judicious assortment of these indicators to guide your interpretation.

Some writers on close reasoning recommend circling these words on the page with a pencil, or marking them in some other way⁸. This may be helpful in complicated cases, or for rank beginners, but it is not ordinarily required. And it cannot be applied unless you have your own copy of the text, and are prepared to have it marked up⁹.

But it is extremely useful to be familiar with these words and to take full advantage of them when they appear in a passage. Here are lists of some of the more

common ones. The ones marked with a * are especially unreliable, but all of these indicators have other uses and you can never trust them blindly.

Conclusion indicators

therefore	it follows that
so	we may conclude that
hence	*must be
thus	*necessarily
consequently	indicates that
accordingly	*implies
ergo	*entails

Premise indicators

since	assuming, as we may, that
for	inasmuch as
*because	seeing that
*as	in view of (the fact that)
as shown by	follows from
may be deduced,	for the reason that
inferred,	
derived from	

When you find premise or conclusion indicators in your passage, and when you can be sure that they are in fact functioning as such, then you know that you do indeed have an argument, and you will be well on the way to discovering its structure.

In passage (3) above, for example, the indicators were "as" (...and as the power of a community...) indicating a premise and "must necessarily be" (...freedom must necessarily be in proportion...) indicating the conclusion.

Here are more examples, with the indicators underlined:

(4) Tecumseh (1768-1813).

These are our lands. No one has a right to remove us because we were the first owners. The Great Spirit above has appointed this place for us, on which to light our fires, and here we will remain¹⁰.

In this passage the author is defending the Indian claim to certain lands. The word "because" indicates that "we were the first owners" is a premise. The sentence about "the Great Spirit above" is very likely also a premise, though there is no indicator.

7. Letter to James Lloyd (October 1, 1823). Bartlett, *Familiar Quotations*, 1980, p. 418:3

8. Stephen Thomas, *Practical Reasoning*, 1981, has a very elegant method for this.

9. It is a SIN to deface a library book. ALWAYS. NO EXCEPTIONS. Libraries are beset by a new tribe of vandals of paleolithic mentality who, with their yellow highlighter pens, their ballpoints, pencils, felt tips and razor blades, lurch down the aisles between the shelves, grunting and slobbering, and now and then cackling insanely as they claw down a book and deposit their hideous markings. Who has not encountered the consequences of this barbarism? Who has not been disgusted and angered by it? Was it for this that the unlettered masses were taught to read? ... But we digress.

10. To Joseph Barron, messenger of President James Madison, 1810. Tecumseh was killed in the Battle of the Thames River, October 5, 1813, not very from London which, however, did not exist at that time. (Bartlett, *Familiar Quotations*, 1980, p. 419:9)

(5) Rousseau (1712-1778) *The Social Contract*, 1754

Since no man has a natural authority over his fellow man, and since force does not give rise to any right, conventions, therefore, remain the basis of all legitimate authority among men¹¹.

In this passage the author is seeking to show that authority rests on convention. We have two premises, each indicated by a "since", and a conclusion indicated by a "therefore".

3.4 The added indicator test

Authors often omit indicator words, or do not use enough of them, leaving us somewhat in the dark as to how they are to be understood. One thing we can do when we are thus puzzled is to put in our own indicator words, and see if that distorts the sense of the passage.

A particularly good word to use for that purpose is the conclusion indicator "therefore". So is the premise indicator "for the reason that." Many times the force and direction of a passage will become instantly clear once we contemplate the insertion of such indicators. Here are some examples of this technique.

(6) Cicero (106-43 B.C.)

History is the witness that testifies to the passing of time; it illumines reality, vitalizes memory, provides guidance in daily life, and brings us tidings of antiquity¹².

Is this an argument? Try "therefore it illumines reality, ..."; That makes no sense. Try "for the reason that it illumines reality ...". Nonsense again, and the same for other possible indicator insertions; there is simply no argument here.

(7) Shakespeare, *The Taming of the Shrew*, 1593?

BIANCA:

I am no breeching scholar in the schools.
I'll not be tied to hours nor 'pointed times,
But learn my lessons as I please myself¹³.

Try a "therefore" after the first line. It fits right in, and we see that we have an argument, though perhaps not a very serious one. Bianca is justifying her intention not to be tied to hours, etc., on the basis that she is not a student in school.

3.5 Restatements

One thing to watch out for is the way authors will frequently say the same thing several times, using different words. Or they will say something that is almost the same, though introducing some new nuance or idea. It then becomes a matter of interpretation to decide whether to treat this as two different statements or as just the same thing repeated.

For example, in the passage above from Tecumseh we have the statement that these lands belong to us and the statement that no one has a right to remove us from these lands. Are these two ideas, or just one? It would be possible, as we will see below, to separate them. But for some purposes it might be better to treat them just as two statements of the same thing.

If we wish to record such a decision we could do so with a notation like this:

Land belongs to us = No one has right to remove

Making these decisions is a matter of judgment, both interpretation and discrimination. It depends on having the right understanding of your author, and also on deciding where to stop in your analysis; the more you refuse to equate different statements the more detailed your analysis will become.

4 Argument structure

In an argument we advance one consideration, or package of them, as support for a second. An argument, therefore, always has a structure; it has two parts, the premise part and the conclusion part. And the parts are related in that the first supports the second, or is at least meant to.

That is a picture of a simple argument, just a premise or premise package supporting a conclusion. But arguments can be complex, consisting of a number of sub-arguments tied together in various ways. Such arguments have a complex structure.

To evaluate an argument it is not enough to understand the components; you must also grasp the structure, simple or complex as the case may be. This means both figuring out what the structure is, and finding a way of representing it, of picturing it or saying what it is, for we

11. Rousseau, *Social Contract*, p. 20.

12. Cicero, *De Oratore*, II, 36. (Bartlett, *Familiar Quotations*, 1980, p. 98:9)

13. III. i. 18.

do not really grasp things until we can represent them.

You find the structure by first following up the indicator words as far as they will take you, and then considering the general plausibility of what the author might have meant. In the process you try out various representations of structure to see if they fit well. And you will also have to consider if there are unstated components of the argument that you will have to fill in.

In the remainder of this module, five methods of representing argument structure, simple or complex, will be presented, and their relative advantages and disadvantages discussed. These are

- The summary method
- The line method
- The diagram method
- The short form diagram method
- The derivation method

Another module will consider more advanced methods of dealing with argument and other logical structures.

4.1 The summary method

With this method you simply restate the argument in a way that clearly brings out the structure. This means using plenty of premise and conclusion indicators, and it also means abbreviating as much as possible the statement of the components. (Information hiding.)

As a simple example, take Tecumseh's argument quoted above.

Tecumseh argues that since the Indians were the first owners and since "the Great Spirit" has appointed the lands for their use, the lands therefore belong to them, and no one has a right to remove them.

The drafting of argument summaries is more of an art than a science. It is a tricky job of prose writing in which a number of different tasks must be accomplished simultaneously, and is not at all easy to do well.

You must, of course, bring out the structure of the argument. But since, often, you write for a reader who does not have the original text of the argument easily available, you must at the same time communicate whatever other information is required to make your summary intelligible.

At the same time you must take care that it is always clear to your audience which views are your own and which are the views of your author.

Often your summary will be a prelude to a criticism and evaluation of the argument. This imposes a special obligation to be fair and accurate. You must not mislead your audience about what is actually in the passage. And beyond this, you must write in such a way that your audience will have confidence in your summary. This often leads to the use of direct quotation on doubtful points or, as in the example above, for terms that you would not expect to be in the normal common vocabulary of the writer and reader of the summary.

But you cannot include everything, so you must use good judgment about what to leave out. To the extent that your summary is aimed exclusively at structure, you may be fairly short in your treatment of the actual substance of the argument. But that deficiency will have to be made good elsewhere. If you are attempting a full evaluation.

A summary is generally necessary if you want to communicate your evaluation to others, so it makes sense, if possible, to use this method from the beginning; indeed, it can be seen as just an elaboration of the main thrust statement. But summary writing gets harder and harder as arguments become more complex. Hence the utility of the other methods of representing structure. They would be helpful even if their only use were as preparation for the writing of a summary.

4.2 The line method

The line method is a formalized version of the summary method. In a simple argument there is just a premise part and a conclusion part. To use the line method, first write the premise, or premises. Then draw a line, write "Therefore", or some other conclusion indicator, and then write the conclusion. The conclusion indicator can even be omitted, since it is implied by the line.¹⁴

Using this method, and ignoring the "Great Spirit" part for the moment, we could represent Tecumseh's argument like this:

We were the first owners of these lands.

So, no one has a right to remove us from these lands.

14. Sometimes a little triangle made of three dots is used as the conclusion indicator. (Equilateral, apex up.) Unfortunately, present equipment does not permit that design to be displayed on these pages.

So far, so good. But we must now start looking at the ways in which arguments can become more complicated.

One source of complication is that an argument may have not a single premise, but a package of premises. The line method is very good for this kind of case. We just list all the premises in the package before drawing the line.

Rousseau's argument above is of this type:

No man has natural authority.
Force does not give rise to any right.

Therefore, authority rests on conventions.

There is another kind of case, however, which is similar to this "premise package" case, but must be diligently distinguished from it. This case arises when you have more than one premise supporting a conclusion, but not as a package; each is the premise of its own independent argument. Instead of having a single argument with a lot of premises, you have a lot of arguments for a single conclusion.. We will use the term *convergent*¹⁵ arguments to describe this situation. In the line method, we simply display convergent arguments as separate arguments.

Consider Tecumseh's argument again; it can be interpreted as really two arguments. One is the "We were first owners" argument shown above. The other is

The Great Spirit appointed these lands for us.

No one has a right to remove us from these lands.

Sometimes it is difficult to decide whether to use a premise package interpretation or a convergent argument interpretation. One test is this: ask whether, if you treated it as two arguments, the strength of one argument would be weakened if you took away (supposed false) the premise of the other¹⁶.

For example, the Great Spirit argument would not itself be weakened if we supposed that the Indians were not the first

owners¹⁷. Nor would the first ownership argument be weakened if we took away the Great Spirit. So we go for the convergent argument interpretation.

4.3 Tacit components

Here is another complication. As we noted above, the author usually will not have spelled out all the components of the argument. There will be a lot left to be "understood" by the reader. Either premises, or the conclusion itself, may be left unstated. Such unstated components of an argument are often said to be tacit, silent, understood or suppressed.

It is a serious problem, discussed elsewhere, how to identify these missing parts, but once we have figured out what they are, it is easy to include them in our representation of the argument structure using the line method — just put them in brackets. This works for all the other methods too, except the summary method.

You might decide, for example, that Rousseau is using some such tacit premise as "Authority comes either from natural right, force or convention." That could be brought into the representation like this:

[Authority comes either from natural right,
force or convention.]

No man has natural authority.
Force does not give rise to any right.

Therefore, authority rests on conventions.

Bracketing a suppressed premise or conclusion is not at present a commonly accepted convention in summaries, where bracketing is only used in quotations to mark off your own words from those of your author; so in a summary you have to accomplish the same end with words, which just makes summary writing all the more difficult.

4.4 The diagram method

In this method we draw a diagram putting the various components of the argument in open boxes, and drawing arrows to indicate the logical relationships. This method is extremely powerful and flexible, and is our method of choice as a workshop technique in untangling the structure of complex arguments. You can use up a lot of scratch paper with it. But since it is not

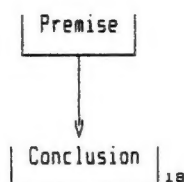
15. The use of "convergent" and "divergent" for the types of argument structure here described seems to have originated with Monroe Beardsley, *Thinking Straight*, 1950.

16. This test is due to Stephen Thomas, *Practical Reasoning*, 1981, p. 55.

17. In the *Old Testament*, a "Great Spirit" appointed certain lands for the use of Abram and his descendants even though the lands were already occupied by other people, the Canaanites. *Genesis* 12:6-7.

widely used outside the circle of students of reasoning, you can seldom use it in communicating your results to others.

Arrows always go from the thing that is doing the supporting to the thing that is being supported. To give the basic idea at once, the pattern for a simple argument is the following:



4.4.1 Abbreviations

One of the first questions to settle is what exactly to put in the boxes. In diagrams, you generally want to abbreviate as much as possible, and that is the case here.

Some writers go all the way, and recommend that you represent the argument components by single letters or numbers. That is all right, but it has the disadvantages first, that it is hard to remember what the letters or numbers stand for, especially if you come back to the diagram after having set it aside for a while, and second, you must somewhere give the key which states what they stand for. Despite these disadvantages, this is the standard method, using letters, in symbolic logic.

At the other extreme, we could put full statements of the argument components in the boxes. No problem in understanding, but it is tedious, takes a lot of space, and makes it harder to grasp the overall structure. We don't get the benefits of information hiding.

In between is the use of "self-evident" abbreviations, ones that are full enough that they can be understood without a key. We generally favour this approach except in formal logic, or when there is a lot riding on the detailed formulation of an argument component.

But there are degrees of abbreviation. As a general rule, if the diagram is only for your use at a particular moment, you can get by with fairly drastic abbreviation. But if you are going to refer

back to it, or show it to someone else, then you will have to be fairly explicit.

And there is a danger in abbreviation to be guarded against. To abbreviate you have to simplify, and the danger is that in using your diagram you will forget that you are only looking at a shortened form of your author's premise or conclusion, not the real thing.

Various approaches to the abbreviation problem will be illustrated in the examples to follow.

4.4.2 Simple argument

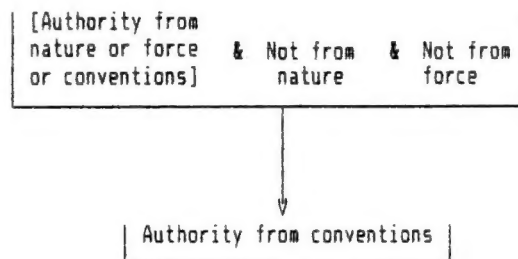
The representation of a simple argument is straightforward. To consider just the "first owners" part of Tecumseh's argument, we could have:

A = We were first owners.
B = No one has the right to remove us.



4.4.3 Premise packages

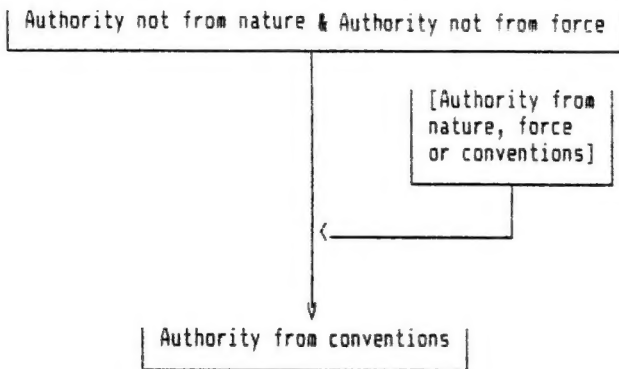
Premise packages are easily handled. We put all the premises of the package in the same box, and connect them with &, which is a sign frequently used for conjunction in symbolic logic. Here is Rousseau:



Notice that we still use bracketing for tacit components of the argument.

There is another way to represent the package situation, and sometimes it seems more natural. We might choose to regard one of the elements of the package as not really belonging in the package, but rather as helping the rest of the package do its job by supporting the linkage between the package and the conclusion. If we used that method here, we might get:

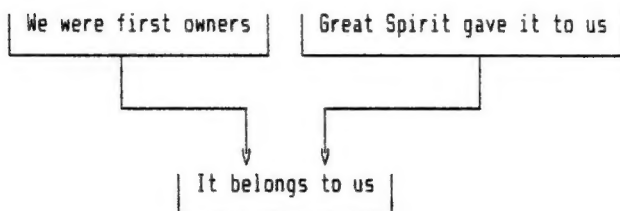
18. There is nothing wrong with diagonal lines except that the present writer can't manage them on an Epson printer in text mode, and can't figure out how to get into graphics mode from the Nota Bene word processor.



These two representations are equivalent as far as the logical evaluation of the argument goes, but sometimes one will seem more natural and intuitive than the other.

4.4.4 Convergent arguments

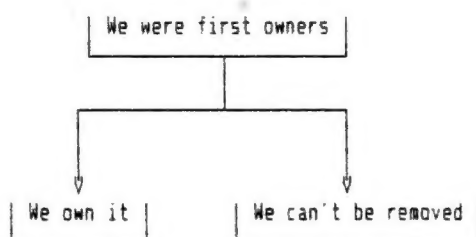
Convergent arguments are also easy. Here is Tecumseh again:



4.4.5 Divergent arguments

It can also happen that the same premise, or premise package, is used to support more than one conclusion. We describe this as a case of **divergent** arguments.

For example, we notice that in the general area of his conclusion Tecumseh mentions two ideas: one about owning the land, and the other about not being removed from the land. It would not be unreasonable to interpret this as two ways of expressing the same thought. But, cutting finer, we might decide to represent them as separate ideas. (After all, you have a right to say there even if you are only renting; and you may be removed even if you own it, say, you are arrested for some crime.) This might lead us to the following representation.

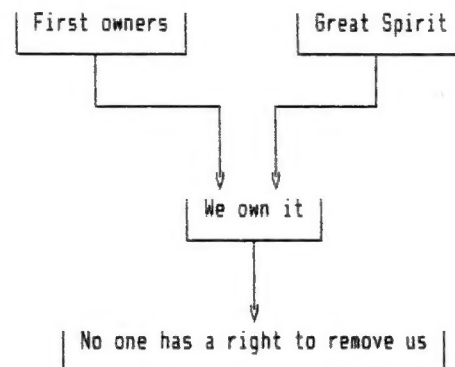


And we would have a similar pair of arguments starting from the "Great Spirit" premise. This would lead to a considerable tangle of arrows, but it could be done.

4.4.6 Chaining

But on reflection we see that this is not really right; the two conclusions are not really meant to be independent, but rather, Indian ownership is the main thing, and that is the reason why no one has the right to remove them.

This is the chaining structure. Indian ownership is an intermediate conclusion; It is the conclusion of one argument, but the premise of another. This is diagrammed in an obvious way:



Here is a more complicated example:

(8) Isaac Watts (1674-1748), *Logick*, 1724.

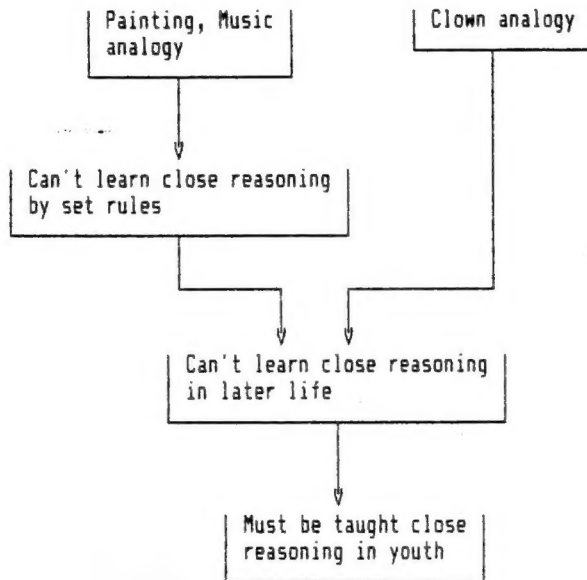
A coherent Thinker, and a strict Reasoner, is not to be made at once by a Set of Rules, any more than a good Painter or Musician may be formed extempore, by an excellent Lecture on Music or Painting. It is of infinite Importance therefore in our younger Years to be taught both the *Value* and the *Practice* of conceiving clearly and reasoning right: For when we are grown up in the middle of Life, or past it, it is no wonder that we should not be able to learn good Reasoning, any more than that an ignorant Clown¹⁹ should not be able to learn fine Language, Dancing, or courtly Behaviour, when his rustic Airs have grown up with him till the Age of Forty²⁰.

In this passage the author is defending

19. Clown: A countryman, rustic or peasant, often implying ignorance, crassness, or rude manners: A mere rustic, a boor. (*Oxford English Dictionary*).

20. Watts, *Logick*, 1724, p. 327.

the early study of close reasoning. Indicator words have been underlined. The "therefore" indicates the conclusion. The "For" indicates a premise. The "any more than"s indicate premises for arguments by analogy, about which more elsewhere.



Notice how we are able to include the two analogies in the diagram without bothering to analyse them. That is more information hiding; in this case the hidden information is labelled.

Notice also that we treat the "Set Rules" component as a premise for the intermediate conclusion rather than as directly supporting the final conclusion. This is done because it makes more sense out of the argument, and in spite of the fact that Watts's formulation tends to suggest the other arrangement.

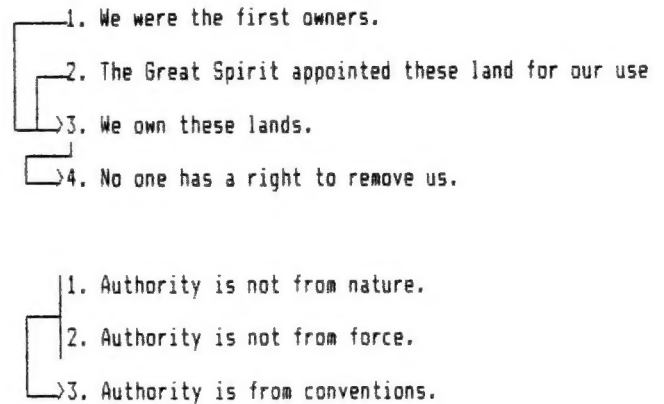
4.5 The short form diagram method

This is a very useful variation²¹ on the diagram method. It saves space, and is better suited to the printed page. Also, since it encourages the writing out of argument components in full, it gets round the abbreviation problem. On the other hand, the results are not as easy to take in at a glance as true diagrams, and it has trouble sometimes handling complex structures.

In this method you simply list the argument components, numbering them, if you like, for ease of reference, and then track the logical relationships with ar-

rows in the left margin. Vertical lines are used to indicate premise packages.

These examples should make the method clear:



4.6 The derivation method

This method is especially good for bringing out the chaining side of an argument; it breaks the argument into steps, and runs a bookkeeping system on the right hand side to keep track of them.

It is not especially good for convergent arguments, and the bookkeeping involves some tiresome detail. However this, in one form or another, has been the standard pattern in mathematics since Euclid (about 300 B.C.), and it is widely used in symbolic logic.

You write down the argument components in a logical order, numbering them as you go along so that you can refer back to them. And to the right of each one you write down the basis on which that component is being entered. Sometimes the basis will be that the component is simply a premise, unsupported by anything else. In that case write down "Premise". But other times the basis will be that the component is supported by some earlier component, or a package of such components. In that case, write "From" and list the numbers of the supporting components.

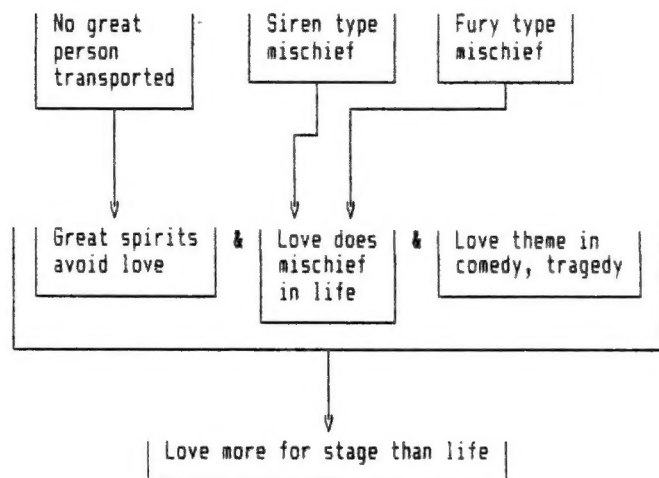
21. Due to Johnson and Blair, *Logical Self-defense*, 2nd edition, 1983, p. 17.

(9) Francis Bacon, (1561-1626) *Essays: Of Love*,

The stage is more beholding to love than the life of man. For as to the stage, love is ever matter of comedies and now and then of tragedies; but in life it doth much mischief, sometimes like a siren, sometimes like a fury. You may observe that amongst all the great and worthy persons (whereof the memory remaineth, either ancient or recent) there is not one that hath been transported to the mad degree of love; which shows that great spirits and great business do keep out this weak passion²².

- | | |
|--|---------------|
| 1. No remembered great and worthy persons have been transported to the mad degree of love. | Premise |
| 2. Great spirits engaged in great business avoid love. | From 1. |
| 3. Love does siren type mischief. | Premise |
| 4. Love does fury type mischief. | Premise |
| 5. Love does much mischief in life. | From 3,4. |
| 6. Love is theme of much comedy and some tragedy. | Premise |
| 7. Love is more for the stage than for life. | From (2,5,6). |

For comparison, here is the same thing in diagram form:



Note in line (7) of the derivation the use of parentheses to indicate a package interpretation, by contrast with line (5), which reflects a convergence interpretation. It should be added that this particular device is not used or needed when derivation is employed in formal logic, since convergence plays no role there.

And in the diagram we see how a package of intermediate conclusions can be handled.

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22. Bacon, *Essays*, p.87. Anyone anxious to construct an *ad hominem* rebuttal will find ammunition in the fact that in 1597, the very year in which his essays were first published, Bacon proposed marriage to a Lady Hatton; she turned him down and married a man who was his rival and enemy.